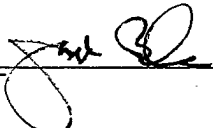


**POLICY DIRECTIVE**

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<b>TRAFFIC OPERATIONS POLICY DIRECTIVE</b>	NUMBER	PAGE 1 OF 3
JACK BODA, DIVISION CHIEF (Signature) 	DATE ISSUED <b>June 25, 2003</b>	EFFECTIVE DATE <b>June 25, 2003</b>
SUBJECT  TMS Sustaining Engineering	DISTRIBUTION  <input checked="" type="checkbox"/> All District Directors <input checked="" type="checkbox"/> All Deputy District Directors - Traffic Operations <input checked="" type="checkbox"/> All Deputy District Directors - Maintenance <input type="checkbox"/> All Deputy District Directors - Construction <input type="checkbox"/> All Deputy District Directors - Project Development <input type="checkbox"/> All Deputy District Directors - Transportation Planning <input type="checkbox"/> Chief, Division of Engineering Services <input type="checkbox"/> Chief Counsel, Legal Division <input type="checkbox"/> Publications (for Distribution to all holders of Traffic Manual) <input type="checkbox"/> Headquarters Division Chiefs for:	
DOES THIS DIRECTIVE AFFECT OR SUPERSEDE ANOTHER DOCUMENT? <input type="checkbox"/> YES <input checked="" type="checkbox"/> NO	IF YES, DESCRIBE	
WILL THIS DIRECTIVE BE INCORPORATED IN THE TRAFFIC MANUAL? <input type="checkbox"/> YES <input checked="" type="checkbox"/> NO	IF YES, DESCRIBE	

**POLICY**

The Division of Traffic Operations provides sustaining engineering services for Transportation Management Systems (TMS). Sustaining engineering services are mission critical to effectively meet the mobility and safety needs of the traveling public. Sustaining engineering services are provided through a combination of in-house staff and consultant services for both custom and commercial-off-the-shelf hardware and software that comprise the TMS. This hybrid support model is adopted to take full advantage of both in-house expertise and necessary consultant services to ensure both the timeliness of short term support response and continuity of support over the long term.

**SUSTAINING ENGINEERING DEFINITION**

TMS Sustaining Engineering is the process associated with the continuing engineering of traffic operational systems. This includes correcting system flaws and deficiencies as well as modifying system hardware and software components to satisfy changing user requirements over time. TMS Sustaining Engineering activities use both in-house and external contractor expertise in contract specifications, management of support contracts, software/hardware engineering, integration of system functions, expansion of capability and adaptation to new needs.

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Examples of TMS Sustaining Engineering activities include the following:

1. Adapting systems to work in new operating environments
2. Adding additional features to respond to evolving user requirements
3. Modifying systems to adapt to more cost-effective technologies or to replace obsolete technologies
4. Implementing changes to reduce the ongoing procurement, operational, or maintenance costs of the system
5. Implementing changes required for interoperability with other systems
6. Implementing national ITS standards
7. Providing for statewide TMS standardization
8. Implementing changes that improve system reliability
9. Implementing changes which improve the effectiveness of system maintenance

**BACKGROUND**

Traffic Operations has developed and maintained traffic monitoring and control systems for several decades. Since 1997, several funding programs have successfully been executed to oversee and manage sustaining engineering needs of the TMS in order to foster and sustain the hardware and software expertise within the Division. Sustaining engineering services are necessary to support day-to-day operations and to provide for the safety of the traveling public. Successful implementation of Intelligent Transportation Systems (ITS) and compliance with national ITS standards such as the National Transportation Communication Protocol for ITS Protocol (NTCIP) also requires in-house hardware and software expertise.

The FHWA requires ITS projects to use a systems engineering approach. Therefore, the Division of Traffic Operations will use systems engineering and configuration management methodologies on existing TMS in the sustaining engineering phase of their product lifecycle. Systems engineering are processes that requires iterative and continuous synchronization between changes in requirements, testing, and design. Each of these system life cycle phases are inter-related and must follow a configuration management process in order to maintain the product's integrity. Numerous system artifacts including system documentation, requirements, design models, test plans and procedures, maintenance and operations manuals, and training materials must be systematically controlled and managed. Continuously validating each phase of the system life cycle prevents engineering designs and documents from becoming obsolete, provides the necessary foundation for backup staff or consultants to assist with the Division of Traffic Operations' sustaining engineering activities, and maintains the current products baseline necessary for future enhancements.

**TMS PRODUCTS SUPPORTED**

As outlined in the TMS Inventory, there are four major aspects of the TMS: Field Elements, Communications, Central Applications, and Information Delivery Systems. Examples of TMS products that the Division of Traffic Operations provides a Sustaining Engineering emphasis include Traffic Signal, Ramp Metering, and Freeway Management Systems. These systems employ a mix of hardware, software, and firmware components:

*Traffic Signal Systems*- Examples include the Local Intersection Program (C8) and the Traffic Responsive Field Master (TRFM) used in the Model 170 Controller; the Central Traffic Surveillance and Management System (CTNET); and the Traffic Signal Control program (TSCP) operates in the Model 2070 Advanced Transportation Controller (ATC).

*Ramp Metering Systems* – Examples include the three different ramp metering programs that operate in a Model 170 controller: the San Diego Ramp Metering System (SDRMS); the Semi-Automatic Transportation Management System (SATMS); and the Traffic Operations Version 2 (TOS V2). Maximizing the benefit of all three of these algorithms along with additional functionality is the Universal Ramp Metering System (URMS), which runs on the Model 2070 controller.

*Freeway Management Systems (at the Transportation Management Centers)* – Examples include the Front End Protocol Translator s (FEPT); Advanced Transportation Management Systems (ATMS); repeater software critical for Performance Measures System (PeMS); legacy ramp metering management systems (Command/Info) and Ramp Metering Information System (RMIS); and the changeable message sign control (SignView and Satellite Operation Center Command System(SOCCS)).

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**SUSTAINING ENGINEERING RESPONSIBILITIES**

**Headquarters Division of Traffic Operations:**

Provides sustaining engineering expertise; develops standards and policies for TMS support; performs sustaining engineering on traffic operations systems to satisfy statewide needs; ensures reliability of TMS products deployed statewide; provides system training and implementation assistance to the districts' traffic operations and maintenance staff; researches and studies products from vendors or private consultants for applicability within the TMS; ensures the integration of systems within the statewide TMS.

**District Traffic Operations:**

In coordination with Headquarters Division of Traffic Operations: participates in TMS sustaining engineering activities; ensures hardware and software products to be reliable before implementation; retrofits TMS systems to implement changes resulting from sustaining engineering activities; assists with testing and training; recommends modifications to functional requirements to improve the safety of the traveling public and quality and usefulness of products.

**APPLICABILITY**

All employees involved with implementation of traffic monitoring and control software for TMS.

☐ If checked, see continuation page(s)

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